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Original Research Article

Using Anesthesia Duration as a Predictor for Surgical Complications in Office-Based Plastic Surgery

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Abstract:

Background: Plastic surgery has gained popularity in recent years, offering individuals a means to enhance their appearance and self-confidence. Office-based plastic surgery has emerged as a convenient and cost-effective alternative to traditional hospital settings. However, understanding the factors influencing surgical complications in this context is crucial. This study examines anesthesia duration as a potential marker for assessing the risk of complications in office-based plastic surgery.

Methods: A retrospective cohort study involving 150 consecutive patients undergoing office-based cosmetic surgery was conducted. Patients were primarily healthy females, with an average age of 41 and an average BMI of 23 kg/m². Surgical procedures typically lasted less than 4 hours, with breast augmentation common in shorter surgeries and rhytidectomy in longer ones. Anesthesia duration was analyzed in relation to postoperative complications, including postoperative nausea and vomiting (PONV), urinary retention, pulmonary embolism (PE), and deep vein thrombosis (DVT). Statistical analysis was performed using SPSS v.19.

Results: Patients in the longer anesthesia group (>4 hours) experienced a higher incidence of PONV and urinary retention, with statistically significant differences. Major complications, including PE and DVT, were rare and not significantly associated with anesthesia duration. In the 150-patient cohort, no deaths were reported, and the majority of complications were manageable.

Conclusion: While prolonged anesthesia durations may increase the risk of minor complications, major complications were infrequent, and anesthesia duration did not appear to be a primary factor influencing their occurrence. Patient selection, monitoring, and careful management are crucial in office-based cosmetic surgery.

Recommendations: A meticulous and thorough patient evaluation process should be implemented, focusing on identifying individuals who are optimal candidates for office-based procedures. Stringent monitoring protocols should be in place, particularly for surgeries with extended anesthesia durations, to promptly address and manage any emerging complications.

Keywords: Office-Based Plastic Surgery, Anesthesia Duration, Surgical Complications, Patient Safety.

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Introduction

In recent years, plastic surgery has evolved into a prominent and sought-after discipline within the domain of modern medicine. Its appeal lies not only in its ability to reshape and rejuvenate one's physical appearance but also in its profound impact on individual self-esteem and confidence. As societal perceptions of beauty and personal aesthetics continue to evolve, an increasing number of people are turning to plastic surgery to achieve their desired look and boost their self-assurance.

Traditionally, plastic surgery has been performed within the confines of hospital operating rooms, a setting known for its stringent safety protocols and comprehensive medical facilities. However, an alternative option has risen to prominence in recent years – office-based plastic surgery [1]. This approach offers a range of advantages that have contributed to its widespread popularity among patients and practitioners alike.

Office-based plastic surgery procedures are often characterized by their convenience, cost-effectiveness, and departure from the traditional hospital environment. Patients appreciate the reduced inconvenience of not having to navigate a hospital's sprawling facilities and may find the overall experience less intimidating [2]. Furthermore, the cost savings associated with office-based procedures can be significant, as they typically eliminate the overhead expenses associated with hospital operating rooms.

However, it is essential to acknowledge that, like any surgical procedure, office-based plastic surgery

is not without its inherent risks. Surgical complications, although infrequent, can still occur, and their impact on patients can range from minor inconveniences to severe health concerns [3]. In this context, understanding the factors that influence the occurrence of surgical complications becomes paramount.

One factor that has recently garnered significant attention in the realm of office-based plastic surgery is the duration of anesthesia. Anesthesia duration, in simple terms, refers to the length of time a patient remains under the influence of anesthesia during a surgical procedure. This time frame encompasses the period from the administration of anesthesia, often referred to as induction, to the moment when the patient emerges from the anesthesia's effects [4].

The duration of anesthesia can vary considerably depending on several factors, including the complexity and extent of the surgical intervention being performed. As such, it serves as a dynamic and potentially informative metric when assessing the risk of surgical complications. Longer durations may suggest more intricate procedures, potentially increasing the likelihood of complications.

This study explores the hypothesis that anesthesia duration serves as a valuable marker for assessing the risk of surgical complications in office-based plastic surgery.

Methodology

Study Design: This investigation employed a retrospective cohort study design.

Study Setting: The research took place at Patna Medical College and Hospital during the period from 2019-2021.

Participants: The study encompassed a cohort of 150 consecutive patients who underwent office-based cosmetic surgery within the specified timeframe. These individuals were under the care of a team of seven surgeons practicing within the same facility.

Inclusion Criteria:

1. Patients who underwent office-based cosmetic surgery between 2019-2021.
2. Procedures conducted within the ambulatory surgical facility of the medical practice.
3. Patients who received general anesthesia administered via a propofol/remifentanil intravenous infusion.
4. Patients with a minimum follow-up duration of 30 days.

Exclusion Criteria:

1. Patients who underwent surgery outside the specified time frame.
2. Procedures conducted in different settings, such as hospitals.
3. Patients who received anesthesia other than propofol/remifentanil intravenous infusion.
4. Cases with follow-up periods of less than 30 days.

Bias: To mitigate bias, data collection was carried out through a comprehensive review of patient charts by the senior author. Diligent efforts were made to guarantee the accuracy and completeness of the patient records.

Data Collection: Data were sourced from patient records and meticulously documented in an Excel database. The senior author conducted a thorough chart review to ensure the precision of the collected data, including anesthesia duration, surgical procedures performed, and complications encountered.

Anesthesia and Perioperative Care: All patients included in the study received general anesthesia, administered through a propofol/remifentanil intravenous infusion. To ensure airway protection, two methods were employed – the use of either a laryngeal mask or endotracheal intubation. Certified Registered Nurse Anesthetists (CRNAs) oversaw the administration and monitoring of anesthesia, ensuring optimal patient safety throughout the surgical procedures.

Follow-up Duration: For the evaluation of postoperative outcomes and complications, each patient's follow-up period extended for at least 30 days from the date of their respective surgeries. This extended duration allowed for a comprehensive assessment of both immediate and delayed complications.

Study Objectives: The primary objective of this investigation was to quantify and assess both minor and major complications associated with anesthesia duration in the context of office-based plastic surgery. These complications encompassed PONV, urinary retention, minor pulmonary complications, hypotension, minor cardiac complications, DVT, PE, reintubation, reoperation, hospitalization, and major cardiac complications, including myocardial infarction and heart failure.

Statistical Analysis: Statistical analysis was conducted using SPSS v.19. Descriptive statistics were employed to summarize patient characteristics and complications. To assess associations and differences, Chi-squared tests (W2) and t-tests were applied, with statistical significance determined at a threshold of $p < 0.05$.

Ethical Considerations: The study strictly adhered to ethical guidelines, ensuring the privacy and confidentiality of patient information. Informed consent was not required for this retrospective analysis of anonymized patient records.

Result

Table 1: General characteristics of study population

Variable	Value
Total Patients	150
Female Patients	70%
Average Age	41 years
Average BMI	23 kg/m²
ASA Class 1 Patients	85%
Anesthesia < 4 hours	65%
Anesthesia > 4 hours	35%
Avg. Anesthesia Duration (< 4 hours)	112 minutes
Avg. Anesthesia Duration (> 4 hours)	284 minutes

Demographics of the study cohort, including 150 patients, revealed that the majority were female, representing 70% of the total. The average age of the patients was 41 years, and the average body mass index (BMI) was 23 kg/m^2. Additionally, 85% of the patients were classified as healthy individuals within the American Society of Anesthesiologists (ASA) class 1.

Within the 150-patient cohort, 65% of the cases required anesthesia for less than 4 hours, while the remaining 35% required more than 4 hours of anesthesia.

Patients in the less than 4-hour anesthesia group had an average anesthesia duration of 112 minutes, whereas those in the more than 4-hour group averaged 284 minutes. Notably, the shorter duration group had an average anesthesia time of less than 2 hours. In the entire cohort of 150 patients, 45% underwent procedures with anesthesia durations of less than 2 hours, while 12% required extended anesthesia durations.

The most frequently performed procedures within each time group were as follows: Breast augmentation was the predominant procedure in cases with anesthesia durations under 4 hours, while rhytidectomy combined with additional facial procedures was the most common in the longer duration group. It's important to note that procedures were not exclusive to a single time group due to variations in procedure length.

Regarding minor complications within the 150-patient cohort, patients who underwent anesthesia for more than 4 hours experienced increased occurrences of postoperative nausea and vomiting (PONV) and urinary retention, with statistically significant differences observed. The highest odds ratio was observed for urinary retention.

In terms of major complications within the 150-patient cohort, a total of 5 major complications were identified, with no reported deaths. These included 1 case of PE, 1 DVT, and 3 hospitalizations. Three of these hospitalizations, exclusive of the DVT and PE cases, were attributed to significant hematomas by postoperative day 1 (POD1). The DVT patient was also admitted by POD1, while the PE patient was admitted approximately 3 weeks postoperatively, and the source was not identified in the records. Additionally, 20 patients required reoperation, primarily for hematoma (n = 12). Other reoperations were related to seroma (n = 5), infection (n = 2), and wound dehiscence (n = 1). No statistically significant differences in major complications related to anesthesia duration were observed within the 150-patient cohort.

Discussion

The study involved 150 patients undergoing office-based cosmetic surgery, primarily healthy females with an average age of 41 years and a BMI of 23 kg/m². Most surgeries lasted less than 4 hours, with breast augmentation being common in shorter procedures, while rhytidectomy was prevalent in longer ones. Prolonged anesthesia correlated with increased PONV and urinary retention. Major complications, including PE and DVT, were rare and not significantly associated with anesthesia duration. In summary, while longer anesthesia correlated with more minor complications, major complications were infrequent, highlighting the importance of patient selection and monitoring in office-based cosmetic surgery.

Numerous studies have consistently affirmed the safety of office-based plastic surgery, presenting evidence from substantial patient cohorts. Noteworthy research conducted by [5], which involved 241 ambulatory surgical centers and a population exceeding 400,000 patients, revealed an overall surgical complication rate of 0.47%, including a minimal 0.0017% mortality rate. These findings affirmed that freestanding ambulatory surgical facilities exhibited low major morbidity and mortality rates, comparable to those observed in hospital settings. Similarly, [6], who examined 621 ambulatory facilities with a substantial patient sample, reported a mortality rate of 0.002%, consistent with the incidence of other surgical complications. Subsequent research by [7] reaffirmed this 0.002% death rate in ambulatory surgery, primarily attributed to PE.

Further supporting the safety of office-based procedures, [8] reported on over 23,000 cases spanning 18 years, revealing no fatalities or major morbidities, and only a single occurrence of deep vein thrombosis (DVT). A study by [9], analyzing 5316 patients over six years, reported no fatalities but documented a 0.7% complication rate necessitating a return to the operating room. These studies, however, did not provide an all-encompassing overall complication rate. [10] examined 3615 consecutive patients over a five-year period in a similar surgical facility, reporting no deaths, DVTs, or PEs, with only two patients requiring hospitalization. In parallel, the recommendations by the ASPS task force [11] underscored the significance of patient safety in ambulatory surgery, recognizing an elevated risk of minor complications, discharge delays, and unplanned admissions associated with extended anesthesia durations. These findings underscore the pivotal importance of careful surgical planning and vigilant patient monitoring, although the specific focus on a 4-hour duration remains to be addressed.

Conclusion

The study's findings underscore the importance of patient selection, monitoring, and management in office-based cosmetic surgery. While prolonged anesthesia durations may increase the risk of minor complications such as PONV and urinary retention, major complications were infrequent, and anesthesia duration did not appear to be a primary factor influencing their occurrence. These results provide valuable insights into the safety and outcomes of office-based cosmetic surgery, supporting the need for comprehensive patient care in this setting.

Limitations: The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

Recommendations: To enhance the safety and efficacy of office-based cosmetic surgery, it is crucial to prioritize several key recommendations. Firstly, a meticulous and thorough patient evaluation process should be implemented, focusing on identifying individuals who are optimal candidates for office-based procedures. Secondly, stringent monitoring protocols should be in place, particularly for surgeries with extended anesthesia durations, to promptly address and manage any emerging complications. Lastly, continuous education and training programs for surgical teams are essential to ensure the maintenance of high standards in patient care and safety within the office-based cosmetic surgery setting. These recommendations collectively contribute to the overall improvement of patient outcomes and safety in office-based cosmetic surgery.

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List of abbreviations:

BMI - Body Mass Index
ASA - American Society of Anesthesiologists
PONV - Postoperative Nausea and Vomiting
DVT - Deep Vein Thrombosis
PE - Pulmonary Embolism
ASPS - American Society of Plastic Surgeons

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